AMENDED CLAIM

B1 sub' C1

1. A blend material useful as a distillate fuel or as a blending component for a distillate fuel comprising: (a) a Fischer-Tropsch derived distillate comprising a 244°F-700°F fraction, and (b) a virgin distillate comprising a 244°F-700°F fraction, wherein the sulfur content of the blend material is ≥ 2 ppm by wt.

AMENDED CLAIM WITH MARKINGS

1. (amended) A blend material useful as a distillate fuel or as a blending component for a distillate fuel comprising: (a) a Fischer-Tropsch derived distillate comprising a [C_8] 244°F-700°F fraction, and (b) a virgin distillate comprising a [C_8] 244°F-700°F fraction, wherein the sulfur content of the blend material is $\geq$ 2 ppm by wt.

Rejection under 35 U.S.C. §112

The Examiner rejected Claims 1-9 under 35 U.S.C. § 112 for two reasons. First, the Examiner stated that the temperature range "C_8 – 700 ° F" was indefinite. The Applicants have amended Claim 1 to convert the C_8 range designation to its equivalent Fahrenheit designation. The specification specifically includes mono-methyl branched paraffins as part of the C_8 fraction. The lowest boiling point for a monomethyl heptane (2-methyl heptane) is 243.7 °F (CRC handbook of Chemistry and Physics, 68th Ed. 1988 at p. C-297). The Applicants have amended Claim 1 to remove the C_8 range designation and to replace it with the equivalent 244 °F. This amendment is not made to overcome the prior art, nor does it narrow the previously claimed range, but is only made to promote clarity in the claimed range.

Second, the Examiner stated that the claim was indefinite for "failing to disclose the relative proportion of [the two components being mixed]". The Applicants must respectfully disagree. As discussed in the interview, so long as the sulfur concentrations of the two blending streams is known, the proportion of each to achieve a final concentration is fixed. This may be shown mathematically by performing a mass-balance on the sulfur. By the conservation of mass, the total amount of sulfur in the final blend must be equal to the sulfur in the two blending streams. Thus,

$$S_{vir} + S_{F/T} = S_{fin} \qquad \text{(I)}$$

where,

S_{vir} = the total amount of Sulfur in the virgin distillate stream
$S_{F/T}$ = the total amount of Sulfur in the Fischer-Tropsch stream
S_{fin} = the total amount of Sulfur in the Final blended Stream.

The total amount of sulfur in any stream must be equal to the Volume of that stream times the concentration of Sulfur in that Volume. Thus,

$$S_{vir} = [S_{vir}]\ V_{vir}$$

$$S_{F/T} = [S_{F/T}]\ V_{F/T}$$

$$S_{fin} = [S_{fin}]\ V_{fin}$$

where,

$[S_x]$ = the concentration of Sulfur in stream x

V_x = the volume of stream x

Making this substitution into Equation (I) produces:

$$[S_{vir}]\ V_{vir} + [S_{F/T}]\ V_{F/T} = [S_{fin}]\ V_{fin} \qquad \text{(II)}$$

It is also important to note that the volume of the final stream must equal the volume of the combined volumes of the two blending streams. Thus,

$$V_{fin} = V_{vir} + V_{F/T} \qquad \text{(III)}$$

Substituting Equation (III) into Equation (II) produces:

$$[S_{vir}]\ V_{vir} + [S_{F/T}]\ V_{F/T} = [S_{fin}]\ (V_{vir} + V_{F/T})$$

Algebraic manipulation allows us to show that the relative proportion of each stream is defined if the concentrations of the blending streams are defined. Thus the above equation becomes

$$[S_{vir}]\ V_{vir} + [S_{F/T}]\ V_{F/T} = [S_{fin}]\ V_{vir} + [S_{fin}]V_{F/T}$$

$$[S_{F/T}]\ V_{F/T} = [S_{fin}]V_{F/T} + [S_{fin}]\ V_{vir} - [S_{vir}]\ V_{vir}$$

$$[S_{F/T}]\left(\frac{V_{F/T}}{V_{vir}}\right) = [S_{fin}]\left(\frac{V_{F/T}}{V_{vir}}\right) + [S_{fin}] - [S_{vir}]$$

$$[S_{F/T}]\left(\frac{V_{F/T}}{V_{vir}}\right) - [S_{fin}]\left(\frac{V_{F/T}}{V_{vir}}\right) = [S_{fin}] - [S_{vir}]$$

$$([S_{F/T}] - [S_{fin}])\left(\frac{V_{F/T}}{V_{vir}}\right) = [S_{fin}] - [S_{vir}]$$

$$\frac{V_{F/T}}{V_{vir}} = \frac{[S_{fin}] - [S_{vir}]}{[S_{F/T}] - [S_{fin}]} = \frac{[S_{vir}] - [S_{fin}]}{[S_{fin}] - [S_{F/T}]}$$

Since [S_{vir}] and [$S_{F/T}$] are a known parameter of the blending streams, and since [S_{fin}] is defined by the claim, the relative proportion of each stream is defined. Since the relative proportion is defined by these known parameters, Applicants respectfully request that the Examiner reconsider her §112 rejection.

Double Patenting Rejections

USP 6,180,842

The Examiner rejected Claims 1-7 under the judicially created doctrine of obviousness-type double patenting over six US patents or applications. The Examiner stated that the claims of the present invention were obvious in light of US 6,280,842 B1. After our interview, the Applicants have come to agree with the Examiner and offer a terminal disclaimer over 6,180,842 with this RCE.

USP 5,689,031

However, the Applicant's cannot agree to terminal disclaimers over the other 5 patents or applications for reasons described herein. In the Final Office Action, the Examiner rejected all claims as obvious-type double patenting over claims 1 and 2 of US 5,689,031. This patent is drawn to a Fischer-Tropsch distillation fraction that may be blended with any other hydrocarbon streams due to the "comprising" transitional language. However, the current invention requires that a different Fischer-Tropsch fraction be blended with virgin distillate, a very specific stream, to obtain a blend of greater than 2 ppm sulfur. This resulting blend accomplishes an unexpected result – the blend exhibits greater stability than either of the blending components.

Nothing in the '031 patent would predict the unexpected result of the final blend's excellent stability from blending two streams of relatively poor stability. Thus, the current invention is not obvious in light of the '031 patent. Indeed, as Paul Berlowitz demonstrates in his §132 affidavit, blending of a Fischer-Tropsch fraction with a LCCO fraction that produces a final blend of greater than 2 ppm sulfur does not produce this effect. Therefore, the blend of the current invention's selected Fischer-Tropsch fraction and virgin distillate fractions to

achieve a final blend of greater than 2 ppm sulfur achieves the unexpected result of superior stability from two produces of relatively poor stability.

USP 5,766,274

The Examiner rejected all claims as obvious-type double patenting over claims 1-3 of US 5,766,274. This patent is drawn to a Fischer-Tropsch distillation fraction (different from the '031 patent) that may be blended with any other hydrocarbon streams due to the "comprising" transitional language. Again however, the current invention requires that a different Fischer-Tropsch fraction be blended with virgin distillate, a very specific stream, to obtain a blend of greater than 2 ppm sulfur. As noted earlier, the resulting blend accomplishes an unexpected result – the blend exhibits greater stability than either of the blending components.

Nothing in the '274 patent would predict the unexpected result of the final blend's excellent stability from blending two streams of relatively poor stability. Thus, the current invention is not obvious in light of the '031 patent. Indeed, as Paul Berlowitz demonstrates in his §132 affidavit, blending of a Fischer-Tropsch fraction with a LCCO fraction that produces a final blend of greater than 2 ppm sulfur does not produce this effect. Therefore, the blend of the current invention's selected Fischer-Tropsch fraction and virgin distillate fractions to achieve a final blend of greater than 2 ppm sulfur achieves the unexpected result of superior stability from two produces of relatively poor stability.

USP 5,807,413

The Examiner rejected all claims as obvious-type double patenting over claims 1-9 of US 5,807,413. This patent is drawn to a Fischer-Tropsch distillation fraction (different from the both the '031 and '274 patents above) that may be blended with any other hydrocarbon streams due to the "comprising" transitional language. The current invention requires that a different Fischer-Tropsch fraction be blended with virgin distillate, a very specific stream of the broader comprising genus, to obtain a blend of greater than 2 ppm sulfur. As noted earlier, the resulting blend accomplishes an unexpected result – the blend exhibits greater stability than either of the blending components.

Nothing in the '413 patent would predict the unexpected result of the final blend's excellent stability from blending two streams of relatively poor stability. Thus, the current invention is not obvious in light of the '031 patent. Indeed, as Paul Berlowitz demonstrates in his §132 affidavit, blending of a Fischer-Tropsch fraction with a LCCO fraction that produces a final blend of greater than 2 ppm sulfur does not produce this effect. Therefore, the blend of the current invention's selected Fischer-Tropsch fraction and virgin distillate fractions to achieve a final blend of greater than 2 ppm sulfur achieves the unexpected result of superior stability from two produces of relatively poor stability.

USP 6,274,029

The Examiner rejected all claims as obvious-type double patenting over claims 1-4 of US 6,274,029 because the "blending material of the instant application overlaps the blended material of .the instant application overlaps the blended material of [US 6,274,029]." In the interview, the Examiner noted that she would consider that the above arguments for the '031 and '274 patents also applied to claims 1-4. However, the Examiner indicated that she was also concerned with an obvious double patenting rejection over claim 11. Specifically, the Examiner was concerned that the current invention would be obvious in light of claim 11 which teaches to blend a Fischer-Tropsch stream which contains up to 50 ppm sulfur with any of the other streams allowed in claim 11 (raw thermally cracked distillates, hydrogenated catalytically cracked distillates and gas oils.)

The Inventor (as provided in the accompanying §132 affidavit) notes that in the research leading to this invention, an experiment was conducted mixing a Fischer-Tropsch stream with a LCCO (light catalytically cracked oil). As the results demonstrate, the mixture of these two streams of relatively poor stability do not produce a blend of strong stability, even though the final ppm is greater than 2 ppm. Therefore, the current invention is a unique species that demonstrates unexpected properties of the broad genus found in claim 11.

USSN 08/971,254

The Examiner rejected all claims as obvious-type double patenting over claims 1-2, 4 and 5-19 of co-pending application USSN 08/971,254. The Examiner was concerned that the

current invention was obvious in light of this application's "comprising" language that allows for the specific Fischer-Tropsch fraction species of less than 50 ppm sulfur to be blended with the genus of various hydrocarbon streams.

The Applicants again respectfully note that the current invention blends a different Fischer-Tropsch fraction with a unique species (virgin distillate fraction between 250 °C and 750 °C) of that genus achieving unexpected results. Indeed, those unexpected results are not demonstrated when the unique Fischer-Tropsch fraction is blended with other members of that genus, as is demonstrated by Paul Berlowitz §132 affidavit. Because the current invention unexpectedly finds unanticipated properties not demonstrated in other blends of the specific Fischer-Tropsch blend with other members of the genus, it is not obvious in light of these claims of USSN 08/971,254.

A terminal disclaimer is provided with this Submission over USP 6,180,842. Applicants submit that the affidavit and arguments provided herein demonstrate that the present invention is not obvious in light of any of the other prior art cited by the Examiner. Applicants respectfully request that the Examiner reconsider and approve these claims in light of these arguments.

Respectfully submitted,

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[X] Pursuant to 37 CFR 1.34(a)

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